

CLAIMS

I claim:

1. An enhanced passive soil vapor extraction system for remediating a site of specified locale that contains soil contaminated with volatile chemicals comprising:
 - a deep well having an upper and lower end, the deep well having a
5 specified depth and position relative to the contaminated site;
 - one or more injection wells each having an upper and lower end, each injection well having a specified depth and location relative to the contaminated site, the lower end of the injection well being in fluid communication with the surrounding soil;
 - 10 a transfer conduit having a first and second end, a portion of the first end of the transfer conduit being coupled to the upper end of the injection well, the second end of the transfer conduit being coupled to the upper end of the deep well;
 - one or more extraction wells each having an upper and lower end, each
15 extraction well having a specified depth and location relative to the contaminated

site, the upper end of the extraction well extending to the land surface, the lower end of the extraction well being in fluid communication with the surrounding soil;

a means for preventing chemical migration of the chemicals horizontally and downward, the means creating a boundary around the contaminants;

2. The enhanced passive soil vapor extraction system described in claim 1, wherein the deep well is located adjacent to the contaminated site but outside the means for prevention of chemical migration boundary.

3. The enhanced passive soil vapor extraction system described in claim 1, wherein the extraction well is located within the means for prevention of chemical migration boundary.

4. The enhanced passive soil vapor extraction system described in claim 1, wherein the injection well is located within the means for prevention of chemical migration boundary.

5. The enhanced passive soil vapor extraction system described in claim 1, further comprising a one-way check valve located within the transfer conduit, the valve having an injection side and deep well side, the valve only allowing air to flow when the pressure on the deep well side of the valve is higher than the pressure on the injection side of the valve.

6. The enhanced passive soil vapor extraction system described in claim 1, further comprising a one-way check valve located within the upper end of the deep well, the valve having an injection side and a deep well side, the valve only allowing air to flow when the pressure on the deep well side of the valve is higher than the pressure on the injection side of the valve.
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7. The enhanced passive soil vapor extraction system described in claim 1, further comprising a one-way check valve located within the injection well, the valve having an injection side and a deep well side, the valve only allowing air to flow when the pressure on the deep well side of the valve is higher than the pressure on the injection side of the valve.
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8. The enhanced passive soil vapor extraction system described in claim 1, wherein the means for preventing chemical migration is an *in-situ* impermeable or semipermeable barrier surrounding the contaminated soil.
9. The enhanced passive soil vapor extraction system described in claim 1, further comprising an impermeable or semipermeable barrier covering the land surface above the contaminated soil.

10. The enhanced passive soil vapor extraction system described in claim 1, further comprising a wind driven or solar powered turbine attached to the upper end of one or more of the extraction wells, thereby increasing the air flow from the extraction well.
11. The enhanced passive soil vapor extraction system described in claim 1, wherein the transfer conduit is branched.
12. The enhanced passive soil vapor extraction system described in claim 1, wherein the coupling of the transfer conduit and injection well creates a joint, the joint being air tight.
13. The enhanced passive soil vapor extraction system described in claim 1, wherein the coupling of the transfer conduit and deep well creates a joint, the joint being air tight.
14. The enhanced passive soil vapor extraction system described in claim 1, wherein the depth of the deep well provides a great enough pressure differential between the deep well and contaminant site to produce air movement from the deep well, through the system and into the waste zone.

15. The enhanced passive soil vapor extraction system described in claim 1, wherein the depth of the deep well is deeper than the injection well.
16. The enhanced passive soil vapor extraction system described in claim 1, wherein the depth of the deep well is 1-2 times deeper than the injection well.
17. The enhanced passive soil vapor extraction system described in claim 1, wherein the depth of the deep well is 2-10 times deeper than the injection well.
18. The enhanced passive soil vapor extraction system described in claim 1, wherein the injection well extends down into the waste zone.
19. The enhanced passive soil vapor extraction system described in claim 1, wherein the extraction well extends down in the soil to a depth equal or above the depth of the contaminants.
20. The enhanced passive soil vapor extraction system described in claim 1, further comprising a deep well conduit, the deep well conduit having an upper and lower end, the deep well conduit being fitted within the deep well, the upper end of the deep well conduit being coupled to the horizontal conduit.

21. The enhanced passive soil vapor extraction system described in claim 1, further comprising an injection conduit, the injection conduit having an upper and lower end, the injection conduit being fitted within the injection well, the upper part of the injection conduit being coupled to horizontal conduit.
22. The enhanced passive soil vapor extraction system described in claim 21, wherein the injection conduit is made of material selected from the group consisting of ABS, PVC and steel.
23. The enhanced passive soil vapor extraction system described in claim 1, further comprising an extraction conduit, the extraction conduit having an upper and lower end, the extraction conduit being fitted within the extraction well.
24. The enhanced passive soil vapor extraction system described in claim 23, wherein the extraction conduit is made of material selected from the group consisting of ABS, PVC and steel.
25. The enhanced passive soil vapor extraction system described in claim 1, wherein the transfer conduit is made of material selected from the group consisting of ABS, PVC and steel.

26. The enhanced passive soil vapor extraction system described in claim 1, wherein a single extraction well is surrounded by multiple injection wells.
27. The enhanced passive soil vapor extraction system described in claim 1, wherein a single injection well is surrounded by multiple extraction wells.
28. The enhanced passive soil vapor extraction system described in claim 1, wherein the deep well can be used as a monitoring well.
29. The enhanced passive soil vapor extraction system described in claim 1, wherein the extraction well can be used as a monitoring well.
30. An enhanced passive soil vapor extraction system for remediating a site of specified locale that contains soil contaminated with volatile chemicals comprising:
- 5 a deep well having an upper and lower end, the deep well having a specified depth and position relative to the contaminated site;
- one or more injection wells each having an upper and lower end, each injection well having a specified depth and location relative to the contaminated site, the lower end of the injection well being in fluid communication with the surrounding soil;

a transfer conduit having a first and second end, a portion of the first end of the transfer conduit being coupled to the upper end of the injection well, the second end of the transfer conduit being coupled to the upper end of the deep well;

- 5 one or more extraction wells each having an upper and lower end, each extraction well having a specified depth and location relative to the contaminated site, the upper end of the extraction well extending to the land surface, the lower end of the extraction well being in fluid communication with the surrounding soil;